What is claimed is:

1. A dry etching method comprising the steps of:

generating electromagnetic waves and magnetic field in an etching treatment chamber under vacuum,

generating plasma by electron-cyclotron resonance, and

etching the member to be treated such as wafer (hereinafter, called "wafer"), wherein

a distance between an antenna, which is arranged in said etching treatment chamber and injects the electromagnetic waves, and said wafer is set at a value in the range from 30 mm to 100 mm,

the frequency of said electromagnetic waves is set at a value in the range from 300 MHz to 600 MHz,

a magnetic field gradient is set,

two kinds of electronic temperature regions are generated between said antenna and the wafer, and

an etching treatment is performed in a condition, that a gas pressure in said etching treatment chamber is in the range from 0.1 Pa to 4 Pa.

2. A dry etching method as claimed in claim 1, further comprises the steps of:

introducing a gas consisting of at least carbon and fluorine into said etching treatment chamber,

generating F (fluorine radicals) and ions

corresponding to CF_2 in said plasma, each amount of which is independent each other, and

performing said etching treatment.

3. A dry etching method as claimed in claim 2, further comprises the steps of:

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introducing a gas consisting of at least carbon and fluorine into said etching treatment chamber,

determining power of a high frequency power source for generating said high electromagnetic waves, and

performing said etching treatment.

4. A dry etching method as claimed in claim 1, further comprises the steps of:

generating electromagnetic waves and magnetic field in said etching treatment chamber,

generating plasma by electron-cyclotron resonance (ECR), and

performing said etching treatment.

5. A dry etching method as claimed in claim 1, further comprises the steps of:

introducing a gas consisting of at least carbon and fluorine into said etching treatment chamber,

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generating electromagnetic waves and magnetic field in said etching treatment chamber,

generating plasma by electron-cyclotron resonance

(ECR),

determining position of ECR,

generating F (fluorine radicals) and ions corresponding to CF_2 in said plasma, each amount of said F and said ions is independent each other, and

performing said etching treatment.

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6. A dry etching method as claimed in claim 1, further comprises the steps of:

introducing a gas consisting of at least carbon and fluorine into said etching treatment chamber with a pre-determined flow rate, and

performing said etching treatment.

7. A dry etching method as claimed in claim 1, further comprises the steps of:

generating F (fluorine radicals) and ions corresponding to CF_2 in said plasma, each amount of said F and said ions is independent each other, in correspondence to an etching process of insulating film, and

performing said etching treatment.

8. A dry etching method comprising the steps of:

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introducing a gas consisting of at least carbon and fluorine into an etching treatment chamber under vacuum,

generating electromagnetic waves and magnetic field in said etching treatment chamber,

generating plasma by electron-cyclotron resonance, and

performing an etching treatment with a wafer, wherein

a distance between an antenna, which is arranged in said etching treatment chamber and injects the electromagnetic waves, and said wafer is set at a value in the range from 30 mm to 100 mm,

a magnetic field gradient is controlled by setting the frequency of said electromagnetic waves at a value in the range from 300 MHz to 600 MHz,

a generation ratio of CF_2/F is controlled by varying two kinds of electronic temperature regions between said antenna and the wafer, and

an etching treatment is performed.

9. A dry etching method as claimed in claim 8, wherein

said etching treatment is performed in a manner that an electronic temperature around the wafer is decreased in accordance with elapsing the etching time corresponding to the etching treatment for contact holes of said wafer.

10. A dry etching method comprising the steps of:

generating electromagnetic waves and magnetic

field in an etching treatment chamber under vacuum,

generating plasma by electron-cyclotron resonance, and

performing an etching treatment with a wafer, wherein

a distance between a wafer facing plane, which is arranged in said etching treatment chamber, and said wafer is set at a value in the range from 30 mm to 100 mm,

a magnetic field gradient is determined by setting the frequency of said electromagnetic waves at a value in the range from 300 MHz to 600 MHz,

two kinds of electronic temperature regions are generated between said wafer facing plane and said wafer, and

an etching treatment is performed in a condition, that a gas pressure in said etching treatment chamber is in the range from 0.1 Pa to 4 Pa.

11. A dry etching method as claimed in claim 10, wherein

said etching treatment is performed by determining power of the high frequency power source for generating said electromagnetic waves.

12. A dry etching method as claimed in claim 11, wherein

two kinds of electronic temperature regions are generated between said wafer facing plane and said wafer,

radicals and ions contributing to said etching treatment in plasma are generated, each amount of said radicals and said ions is independent each other, and

performing said etching treatment.

13. A dry etching method as claimed in claim 10, wherein

electromagnetic waves and magnetic field are generated in said etching treatment chamber,

plasma is generated by electron-cyclotron resonance (ECR),

determining position of ECR, and

performing said etching treatment.

14. A dry etching method as claimed in claim 13, wherein

a gas consisting of at least carbon and fluorine is introduced into said etching treatment chamber,

two kinds of electronic temperature regions are generated between said wafer facing plane and said wafer,

F (radicals) and ions corresponding to CF_2 in plasma are generated, each amount of said radicals and said ions is independent each other, and

said etching treatment is performed.

15. A dry etching method as claimed in claim 14, wherein

said etching treatment is performed by determining said magnetic field gradient and the flow rate of said gas consisting of at least carbon and fluorine.

16. A dry etching method as claimed in claim 14, wherein

F (fluorine radicals) and ions corresponding to CF_2 in said plasma are generated, each amount of said F and said ions is independent each other, in correspondence to an etching process of the oxide film, and

said etching treatment is performed.

17. A dry etching method comprising the steps of:

generating electromagnetic waves and magnetic field in an etching treatment chamber,

generating plasma by electron-cyclotron resonance, and

performing an etching treatment with a wafer, wherein

a distance between a wafer facing plane, which is arranged in said etching treatment chamber, and said wafer is set at a value in the range from 30 mm to 100 mm,

a magnetic field gradient is determined by setting the frequency of said electromagnetic waves at a value in the range from 300 MHz to 600 MHz,

the generation ratio of CF_2/F is controlled by making two kinds of electronic temperature regions, which are generated between said wafer facing plane and said wafer, variable by controlling the magnetic field gradient, and

the etching treatment is performed.

18. A dry etching method comprising the steps of:

introducing a gas consisting of at least carbon and fluorine into an etching treatment chamber under vacuum,

generating plasma by electron-cyclotron resonance, and

performing an etching treatment with a wafer, wherein

a distance between a wafer facing plane, which is arranged in said etching treatment chamber, and said wafer is set at a value in the range from 30 mm to 100 mm,

each of frequencies of a high frequency power source for generating first electromagnetic waves and a high frequency power source for generating second electromagnetic waves is set at a value in the range from 300 MHz to 600 MHz, respectively,

high frequency bias having a lower frequency either of the first electromagnetic waves and the second electromagnetic waves is applied to a process platform, the wafer is treated thereon,

two kinds of electronic temperature regions are generated between said wafer facing plane and said wafer,

F (fluorine radicals) and ions corresponding to CF_2 are generated, each amount of said F and said ions is independent each other, and

an etching treatment is performed in a condition, that a gas pressure in said etching treatment chamber is in the range from 0.1 Pa to 4 Pa.

19. A dry etching method comprising the steps of:

introducing a gas including at least Cl or Br into an etching treatment chamber under vacuum,

generating electromagnetic waves and a magnetic field,

generating plasma by electron-cyclotron resonance, and

performing an etching treatment with a wafer, wherein

a distance between a wafer facing plane, which is arranged in said etching treatment chamber, and said wafer is set at a value in the range from 30 mm to 100 mm,

a magnetic field gradient is determined by setting frequency of the electromagnetic waves at a value in the range from 300 MHz to 600 MHz, respectively,

two kinds of electronic temperature regions are generated between said wafer facing plane and said wafer,

Cl radicals or Br radicals, and ions are generated, wherein a generation amount of said Cl radicals or Br radicals, and a generation amount of said ions are independent each other, in correspondence to an etching process of gate electrodes including polycrystalline Si or metallic circuit including Al, and

an etching treatment is performed.

20. A dry etching method comprising the steps of:

generating plasma in an etching treatment chamber by high frequency waves, and

performing an etching treatment with a wafer, wherein

a distance between a wafer facing plane, which is arranged in said etching treatment chamber, and said wafer is set at a value in the range from 30 mm to 100 mm,

frequency of said high frequency waves is set at a value in the range from 10 MHz to 100 MHz,

an electronic temperature region depending on said high frequency is generated, and

a SAC manufacturing is performed selectively on an oxide in comparison with silicone nitride film in a condition, that a gas pressure in said etching treatment chamber is in the range from 0.1 Pa to 4 Pa.

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21. A dry etching method as claimed in any one of claims 1 to 15, 17, and 19, wherein

said magnetic field gradient in said electron-cyclotron resonance (ECR) region is set so that a ratio of magnetic field gradient/magnetic field intensity is in the range from 0.15/cm to 0.01/cm.

22. A dry etching method as claimed in any one of claims 1 to 21, wherein

high frequency bias of 400 kHz to 13.56 MHz is applied to said process platform for wafer.